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ABSTRACT

This paper discusses building smart communities (i.e., communities that provide an advanced communication and information infrastructure and that enable residents and organizations to make good and independent use of these technologies) that benefit blind and visually impaired persons. The first section summarizes ways that the potential of smart communities for blind and visually impaired people can be realized. The second section provides a definition and description of a smart community. The third section lists areas for the application of technology. The fourth section summarizes barriers to the development of smart communities for blind and visually impaired people. The fifth section, presents an action agenda for building smart communities that includes: (1) vision--developing and communicating a clear vision; (2) community engagement, including conducting an inventory/needs assessment; (3) smart services, including principles for smart services and accessible World Wide Web portals; (4) infrastructure, including building an accessible information technology infrastructure, providing equitable and affordable access, adaptive technology, and a high speed connectivity plan; (5) training and education--training people to use the information technologies in creative and innovative ways; (6) strategic partnerships--building a coordinated, multi-member, community-wide partnership; (7) identify smart community champions; and (8) develop a business plan. The appendix presents examples of smart community developments in Canada, France, and Scotland. (MES)

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Building smart communities: what they are and how they can benefit blind and visually impaired persons

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Paper

1. INTRODUCTION

Smart community initiatives offer the potential to enhance social, cultural and economic development for blind and visually impaired people that no one could have imagined as recently as a few years ago. For the first time in history blind and visually impaired people can hope to receive the level of information services that the general population takes for granted. However, this potential can only be realized by creating smart communities by and for blind and visually impaired people. This can be done in two ways. One way involves creating a public policy framework that supports the appropriate technology requirements and is based on a service base provided through charitable institutions. The second way is to tie the needs of blind and visually impaired people to the commercial, infotainment sector and take advantage of the power of commodification. The first way represents the status quo. The second way requires a radical break in established norms. Both ways are based on the development of smart communities for blind and visually impaired people.

2. DEFINITION AND DESCRIPTION

Smart communities are a new and evolving concept. "Smart communities" are defined as:

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Communities that provide an advanced communication and information infrastructure and that enables residents and organizations to make good and independent use of these technologies. To be "smart" the use of technology must be interactive or must lead to a transaction, that is, on-line activity must be more than a passive act. The members of smart communities must be able to use the technologies to transform information into knowledge.

The definition of a smart community for blind and visually impaired persons would be expanded to include:

Communities that enhance the new technologies by:

* including the use of adaptive technologies and the requisite standards that enable the creative use of technology through the conversion of electronic files to the alternate formats, such as reading machines that can convert printed text to spoken word or braille, and screen readers that can read online books from the Internet or from computer disks.

The key elements of a smart community are:

- Technology: the tool that enables a smart community to function.
- Digital Content: the building material.
- Relationships between people: the glue that holds the smart community together.
- Interactive/Transactional applications: the processes that give smart communities a purpose.

The success of a smart community initiative is dependent on:

- the rethinking of community
  Smart Communities must think of "community" in a different way. Local communities must see themselves as largely self-governing and they must see themselves as "part of an interlinked global community." Blind and visually impaired people must approach smart technologies as a unified, self-governing and interlinked global community.
- an effective information/innovation interface.
- a high level of education.
- the capability to self-educate long after the formal education process has been completed.

A smart community is animated by:

- the free and open flow of information
- the able, creative and extensive use of advanced digital information and communications technologies.
- extensive interpersonal communications
- the connectedness of information-skilled people to each other
- global communications
  Global communication networks have enabled us to communicate on a regular basis with other people around the globe. Global communications have expanded our social, cultural and economic circles. Both large and small companies that in the past conducted their businesses in limited, local environments are now doing business around the globe. Social, cultural and economic globalization will continue.
- multi-partner approaches
  Smart community initiatives must be approached in a collective and coordinated way. This is particularly true of the blind and the visually impaired community. Individually, the blind community or the visually impaired community does not have the resources to successfully initiate a

smart community initiative.

If the blind community approaches smart community development in a fragmented, competitive way, it will not be able to benefit from them. The coordinated, multi?partner approach to dealing with information technology trends is one of the defining characteristics of the smart community movement and one of the major tasks of any smart community initiative.

The blind community must partner with the visually impaired, learning disabled, and physically disabled community at a minimum in order to initiate a successful smart community initiative.

3. APPLICATIONS

Smart Communities are built upon a foundation of exciting, life?enhancing smart applications that use existing and emerging technologies. These technologies are most typically applied to the areas of:

- Health/Medicine
- Environmental Management
- Employment: Telework and Telecommuting
- Education and Learning
- Transportation Information
- Social Services
- Law and Public Safety
- Housing
- Tourism
- Access to Government
- Community Networks
- Resource Sectors

One word about employment in the smart community. "More than 60 percent of the new jobs in the future will be computer and Internet related, and without computer skills, minorities and other marginalised people will become even more estranged from opportunities that help define one's quality of Life." Employment for blind and visually impaired people rests with smart technology.

4. BARRIERS

The major barriers to the development of Smart Communities of blind and visually impaired people are:

- that people who could use technology in an interactive way are being denied access to it because their needs are not fully considered in the IT society. Limiting technologies such as graphical user interfaces and mouse-driven systems reduce access.
- lack of awareness and information about assistive technologies
- lack of skills; lack of sources of specialized instruction
- lack of sufficient understanding of the potential of the technology vinadequate access to high bandwidths
- cost

5. AN ACTION AGENDA FOR BUILDING SMART COMMUNITIES

The building of smart, connected communities is a dynamic and ongoing process.

Each community is different in terms of background and priorities. Built on solid local infrastructure and partnership arrangements, smart communities bring people together to solve mutual problems and support and build on existing relationships.

The following action agenda will help with the development and sustainability of smart community initiatives.

5.1 Vision: Develop and Communicate a Clear Vision

The Blind and Visually Impaired Community must agree upon a new and clear vision that will guide the development of a smart community. The new vision should include:

- full and equitable access to library services for blind and visually impaired people.
- the products and services provided for and by the smart blind and visually impaired community are of use and value to other communities

5.2 Community Engagement

Engagement is the process of collectively identifying community strengths and weaknesses, matching solutions with problems and sharing expertise with others toward the goal of ensuring that a significant percentage of community members will benefit from any Smart Community initiative. Individual blind and visually impaired people must approach smart community development as members of a larger, engaged community. No one else can do this for you, and it cannot be done for you by a select, representative group. It requires significant community participation.

5.2.1 Conduct an Inventory/Needs Assessment Conducting a needs assessment is one of the fundamental elements of developing a Smart Community. The collective expression of need by the community must be analyzed in order to set priorities for the Smart Community initiative.

A new smart community initiative should begin by:

- conducting an inventory of what is, with an emphasis on accessible web sites and accessibility products,
- conducting a needs assessment to determine what people want from a smart community initiative. Needs assessments determine the content and applications that people, companies and organizations need to be connected to and the content that should be created to enable people to benefit from the smart community.

5.3 Smart Services

Smart services are services that are informative, interactive, innovative, improving and international in scope. Smart services enrich the lives of members of a Smart Community by enabling them to meet the business and personal challenges of the information age through the use of information and communications technology. Smart services provide networked communities with interactive software and multimedia content that is delivered through secure and private in-home, at-work or community access facilities to improve the overall economic, social and cultural well being of a community.

Each community will have to develop a suite of smart services or applications that accurately reflects the developmental priorities of the community.

Smart Services for the Blind and Visually Impaired should be:

- commodified and taken out of the charitable sector. They could be provided by the nonprofit or social sector.
- turned into mass market products and services (digitized voice)
- based on sensory-rich production, which includes the senses of hearing and touch, and high level of entertainment (broad marketability).

The Internet and the Web have become commodification and commercialization drivers. Although much of the early discussions around the Internet involved the concepts of equity and empowerment through public policy and government legislation, this has changed considerably in the past few years. The focus is on commercialization and commodification of information-based products. If the Blind and visually impaired community wants to be a smart community and take advantage of the new paradigms offered by the new technologies, the community will have to focus on commercializing their requirements rather than presenting arguments for equity based on a concept of public obligation or responsibility.

To commercialize and commodify the requirements of the blind and visually impaired smart community will take a great deal of imagination and innovation.

The innovation must include seeing the smart blind and visually impaired community in much larger and different terms. For example, this smart community must include other groups of challenged individuals such as those with dyslexia or physically limiting disabilities. The blind and visually impaired community must partner with other communities that have the same or similar requirements from the new technologies. This smart community must see itself in global terms, rather than one restricted to a national area. It will be important to create the critical mass necessary to build a market that will support commodification and commercialization. I think that the key will be to convince enough sighted people, especially at the executive level, that they don't want to have to type in everything they wish to communicate and that they don't want to suffer ongoing eyestrain from the continuous reading of material on screens. Some of the current overwhelming information flow in print must be redirected to the audio and tactile senses.

Of course, there is likely to be strong opposition from the established nonprofit industry and bureaucracy that has been established to serve the blind and visually impaired. The commercial approach represents a radical departure from the current charitable approach, but then the Internet has radically changed the approach to how we do things in many ways.

5.3.1 Principles for Smart Services Smart Services should be based on the following six principles:

Principle 1: Smart services result in transactions; content must lead to transactions. In this context, a transaction is defined as a series of web-based interactions that result in the completion of a process. A transaction is more than interactivity. For example, being able to check a library catalogue on-line and verify the location of a book is an interactive service. Being able to actually order the book and have it delivered is a transaction, or a 'smart' service.

Principle 2: Relationships drive transactions

Principle 3: Smart Communities give away/share information

Principle 4: Smart Communities must facilitate community transactions / interactions

Principle 5: Smart services are cross-sectoral, that is, they are not restricted by

functional, organizational or jurisdictional borders.

Principle 6: Smart services provide services or information at the level required by the user, which drill down to the required information level, and they provide the level of service detail that is required by the user.

5.3.2 Accessible Web Portals Smart communities should increase the ease and equity of access to timely, well organized (simple, clear, user-oriented) comprehensive applications and content resources and services. In a web-based environment the best way to provide easy access to information is through Web Portals.

The Portal should:

- provide an easy-to-use index to existing resources
- provide access to web sites with full-text
- be easy to update and change so that organizations can amend their information and links without substantial technical expertise
- be based on universal design principles that "are usable by people with the widest range of abilities, operating within the widest range of situations (environments, conditions, and circumstances)."
- be governed by established policies that address ethical, liability and copyright issues. For example, policies regarding Terms of Eligibility and Appropriate Use will be essential.

5.4 INFRASTRUCTURE: Build an Accessible Information Technology Infrastructure.

"Infrastructure" includes the computer networks, systems and hardware and software necessary for a smart community. Smart infrastructures combine high-speed, two-way communications capabilities with an Internet Protocol (IP) network and sufficient bandwidth to support the services needed by a community.

5.4.1 ACCESS - Provide equitable and affordable access Smart communities for the Blind must ensure that everyone who is blind or visually impaired:

- is connected and has access to the new computer and adaptive technologies. Home access must be the goal.
- has the opportunity to learn the information technology skills they need.
- has access to accessible Internet access sites with adaptive technology if they do not own computers, have connectivity etc.
- has access to technology that is not dependent on using a mouse
- has access to assistance with access and connectivity.

5.4.2 Adaptive Technology Readily available computers and adaptive technologies are essential if blind and visually impaired persons are going to create smart communities.

The term `adaptive technology' refers to any device, computerized or mechanical, that enables blind or physically disabled people to use printed or digital information.

Adaptive technology includes:

- screen readers (software) interfaced with voice synthesizers (hardware)
- braille printers/braille display
- screen magnification systems
- magnification systems

- voice recognition systems/ speech synthesizers
- breath-controlled typing and point and click systems
- closed captioning
- audio descriptioning

Wherever possible smart community development for blind and visually impaired people should rely on off-the-shelf hardware and software.

5.4.3 High Speed Connectivity Plan Smart communities must build a high speed data and Internet Protocol (IP) network that serve the community.

A High Speed Connectivity Plan should include recommendations regarding:

- high speed backbone which will provide affordable access to public and private institutions
- sufficient bandwidth to deliver audio products and teleconferencing; tele-conferencing capabilities will enable services, such as, distance education offerings, virtual job interviews, virtual medical consultations or tele-health
- fibre-optic, wireless, and satellite-based connectivity options
- scalability, compatibility, integration
- extending highspeed data access lines throughout the community especially in those areas that currently don't have high speed access
- linkages to major institutions
- building the technological capacity that will encourage business and economic growth in the new economy in the area. This economic growth will result in an increase in the number of good quality jobs that are available in the knowledge-based economy.

5.5 Training and Education: Train people to use the information technologies in creative and innovative ways

Smart Communities should ensure that basic training in the use of the Internet, World Wide Web and information technology is available and affordable. When possible, and in certain economic circumstances, basic training should be free. Formal training programs located in accessible technology learning centres should be supplemented by volunteer mentors and onsite trainers that would be available to help people at public access sites. A regional help desk should be established to help people with basic connectivity problems.

5.6 Strategic Partnerships: Build a Coordinated, Multi?member, Community?wide Partnership.

Smart Communities should be built on a foundation of trust and mutual benefits through cooperative ventures and strategic alliances. The partnerships should include current connectivity initiatives so as to avoid duplication of database and web site development. Smart Communities must mobilize all the municipalities and the numerous groups and organizations that will be required to implement this initiative. Partners are needed that:

- can contribute significant resources to realizing the vision
- are already engaged in connectivity and digital content projects
- can provide access to those who do not own their own computers
- can engage people in the Smart Community project

5.7 Identify Smart Community Champions

Individuals who can take charge, with high public profiles, influential, non-political

and with cross-sectoral interests should be identified to champion and implement the Smart Community initiative.

Smart Communities for blind and visually impaired persons should consider a regional approach. In a regional initiative regional leaders should be identified. Regional leaders should work to connect their assets through collaborative initiatives.

Create a Smart Community Leadership Committee
A representative, cross-sectoral Leadership Committee should be created to:

- seek agreement on the vision (mission, values, action plans)
- coordinate community-based development
- develop a collaborative and consensual approach to finalizing and implementing an Action Plan.

5.8 Develop a Business Plan for the Smart Community

A business plan will be required for grant submissions and to gain buy-in from the community, especially the business community. A budget should be developed to support the action plan. Smart communities must look at new approaches and sources for funding.

Conduct Coordinated Research Into, and Develop Applications for, Potential Funding Sources Potential multiple-funding sources will be maximized through a coordinated approach to funding. Coordinated research should be conducted to identify sources of funding that will support connectivity.

6. CONCLUSION

Smart Communities are about creating a community based on a new ethic of cooperation and collective action, shared resources and information. The essential players will include governments, educational institutions, nonprofit organizations, social institutions, local businesses and visionary individuals. Through the power of cooperation and shared knowledge the Smart Community will increase the quality of life and the competitive capacity of the area. Smart Communities are an innovative response to the social and economic changes that have occurred as a result of the dramatic development in information and communications technologies.

A Smart Community is a work in progress that will depend for success upon imagination and commitment.

> "Smart communities require an act of the imagination and what must be imagined is the idea of the smart community itself."

(Adapted from Benedict Anderson's Imagined Communities)

APPENDIX A:

EXAMPLES OF SMART COMMUNITY DEVELOPMENTS

A Municipal Model ? Grande Prairie CyberCity, Grande Prairie, Alberta, Canada
www.city.grande?prairie.ab.ca/home_cy.htm
Grande Prairie CyberCity is a good example of a smart city initiative that is driven by the municipal government. It began as an effort to integrate and share information among municipal departments. The original purpose of the project was to enable the

City of Grande Prairie to discharge its part of the responsibility government has in the development of electronic communications.

The initiative has three principal thrusts:

- X Cooperative deployment of shared high?speed equipment, systems and software providing universal interactive access to data and information,
- X Generation of awareness throughout every segment of the community concerning the opportunities and challenges of living and competing in the Information Age, and
- X Assurance of affordable, managed, interoperable equipment and network connections which are reliable, expandable and secure.

Grand Prairie is using information technology to aggressively promote local economic development. Fibre?optic links installed in all public buildings are enhancing the community's connectivity, allowing the transmission of text, images and multimedia presentations to attract potential developers and investors to set up businesses and create jobs.

A Community?Based Model ? The Lanark County Community Info Net, Lanark County, Ontario, Canada

http://www.lccin.on.ca

The Lanark County Community Info Net (LCCIN) is a not?for?profit corporation with a mandate to

a. undertake public education and provide public access points to allow all citizens of rural and urban Lanark County the use of up?to?date electronic communications and multi?media information systems;
b. improve communications and promote networking among social service agencies, organizations, businesses, schools and special interest groups of Lanark County in order to promote County activities and to avoid duplication of effort;
c. promote and provide funds for education, including continuing education, and promote the development of technical skills to increase opportunities for the development of a highly skilled work force within Lanark County.

Starting in 1995, LCCIN has significantly raised the level of awareness regarding the potential of telecommunications among all sectors of the population in Lanark County and through its promotional activities has caused a greater and earlier use of use of computers and associated technology to occur.

Parthenay, ville numérisée. France

http://www.district?parthenay.fr/sommaire.htm

Parthenay, capitale de la Gâtine, est surtout connue pour son patrimoine monumental qui forme un ensemble cohérent et particulièrement représentatif d'une ville médiévale: château et fortifications, maisons à pans de bois, églises romanes et gothiques.

Le projet "Parthenay, ville numérisée" est né d'une dynamique préexistante de développement local. Depuis 1996, plusieurs espaces numérisés mettant à disposition des ordinateurs connectés à internet et à l'In-Town-Net (District de Parthenay) ont été mis en oeuvre. On y trouve des informations sur la vie de la commune, celle des associations. On y commande un acte d'état civil. On y consulte le cadastre.

Plusieurs espaces de ce type ont été créés dans différents quartiers de Parthenay. Chacun dispose d'animateurs multimédia, spécialistes du domaine abordé, dont le but est de permettre aux utilisateurs d'être autonomes. Particuliers de tous âges, grands parents entraînés par leurs petits enfants, associations, entreprises, administrations les fréquentent. Ainsi, la Maison de la citoyenneté active accueille des chômeurs qui apprennent à rédiger un CV, à rechercher des annonces sur le Net, des informations sur des entreprises, etc.

Parthenay, capital of Gâtine, is known for its monuments which are particularly representative of a medieval city: castle and fortifications, wooden houses and Romanesque and Gothic churches.

Parthenay, the digital city consists of digitized spaces connected to the Internet and the Town-Net (District of Parthenay). Information is provided on the life of the village, organizations. Several on-line services are also provided including access to marital records and a land registry.

Several electronic spaces of this type have been created. Individuals of all ages, including parents and children, associations, companies and government agencies use these sites. For example, the House of the active citizenship provides information for the unemployed who learn how to write CVs, find job ads on the Net, locate information on companies, etc.

Craigmiller Community Information Centre, Edinburgh, Scotland

http://www.ccis.org.uk The Craigmillar Community Information Service (CCIS) is a community-based team project, situated on the East side of Edinburgh that provides information network services to the local community.

Teleport is the new EEC-FUNDED arm of CCIS (http://www.teleport.org.uk. The aim is to provide good basic grounding in computer & IT skills. Teleport trains users in basic software packages and skills - word processing, spreadsheets, databasing, desktop publishing & desktop presentation. Teleport also prides IT-based conference & presentation services. Designed for use by both local community groups and businesses, the conference space is comfortable, spacious, fully IT equipped & available to rent.

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